File Copy

RS - INT
REGENERATION
Planting - Fp-8

March 26, 1941

A COMPARISON OF THE RELATIVE MERITS OF SEEDING AND PLANTING FOR REFORESTATION IN THE PONDEROSA PINE TYPE OF SOUTHERN IDAHO

WORKING PLAN AND ESTABLISHMENT REPORT

(Compiled by C. S. Schopmeyer from miscellaneous notes and memoranda by T. E. Maki and E. L. Mowat)

Introduction

This project was originally set up as a comparison of the relative efficiency of seeding and planting in the ponderosa pine type of southern Idaho. The initial seedings and plantings were made in the fall of 1938 and the spring of 1939, but survival resulting from this installation was too low to provide a reliable comparison of the two reforestation methods.

The same plots were replanted and reseeded in the fall of 1939 and the spring of 1940. In this installation the design of the field installations was changed to introduce fertilizers with the object of stimulating initial growth of seedlings and thus increasing the chances of their survival. This installation also failed. The probable cause of failure was too high concentration of fertilizer in the vicinity of the roots of the seedlings.

A third planting and seeding installation in the fall of 1940 and the spring of 1941 was proposed using essentially the same plot design as in the 1939-40 installation but without the application of additional fertilizer. In this third job an effort was made to diffuse the fertilizers by mixing them with a larger body of soil in the vicinity of the planted or seeded spots. This mixing combined with leaching over a period of one year is expected to reduce the concentration of the fertilizers to

an amount more favorable to seedling growth than the original concentration, and yet maintain an appreciably different micro-edaphic condition from the unfertilized spots.

The purpose of this report is to give a complete description of the work done on this project to date as determined from the unorganized notes in the files and to formulate a working plan for the future.

Plot Locations

The installations for this experiment were made on three different sites as follows with the designated plot numbers:

77. Elk Creek, flat, near plot 33, T. 6 N., R. 6 E., Sec. ~~29~~ 6, Boise Meridian.

78. Granite Creek, north slope, next to plot 26, T. 6 N., R. 6 E., Sec. 29, Boise Meridian.

79. Little Baldy area, ~~south~~ east slope brushfield above south R.P. enclosure, T. 6 N., R. 5 E., Sec. 22, Boise Meridian.

A map of the Granite Creek area showing the plot location should be made in 1941. The Little Baldy area should be plotted on the map of the station headquarters. The Elk Creek plot should be plotted on the map of the Elk Creek Planting Area. Plot markers should be installed.

Original Treatments.- Fall 1938-Spring 1939

The original installations involved seeding and planting in both the fall and spring seasons. Two degrees of spot preparation consisting of large scalps 30x30 inches and small scalps 12x12 inches were made. On the seed spots two methods of protecting the spots from rodents were used. One was conical hardware cloth screens and the other was cotton netting cut in 15-inch squares, placed flat over the seed spot and held in place with soil around the edges. The screens were left in place until the end of the first growing season, but the cotton netting was removed at the time of germination to permit seedling emergence.

Planting Stock Used in 1938-39 Installation

No record has been found of the source of stock used in the 1938-39 plantings. It is assumed that all of the stock was from the same source. The stock was sorted into two size grades designated by numbers 1 and 2 with number 1 being the larger. One tree of each grade was planted in each spot, thus providing two trees per spot.

No record of the source of seed used in the 1938-39 seeding has been found. Spring seeding was done April 12-20, 1939. = Local 1936 seed crop R.L.M.

Results - 1938-39

First year survival of the seeding and planting plots on the Little Baldy and Elk Creek areas was practically nil. These plots will have to be classed as complete failures. No future examinations will be necessary on these two plots as far as the 1938-39 installations are concerned. Existing data should be compiled, however.

First year survival on the Granite Creek north slope plot was somewhat better and may provide some leads on the better treatments if an analysis of variance is made using a suitable transformation for the small whole numbers in which the survival data are expressed.

Second year survival data were obtained on some of the rows of this plot in the fall of 1940. This examination should be completed in the spring of 1941 before the growing season starts. Third and fifth year survival counts may also be desirable on this plot.

Second Installation - Fall - 1939, Spring - 1940

The three plots were replanted and reseeded in the fall of 1939 and spring of 1940 with additional replications of fall seeding with screens and fall planting in place of spring seeding with hardware cloth screens

and cotton netting. In addition, fertilizer comparisons were superimposed on all rows.

The original treatments and the revisions are best shown by the plot diagrams of the three plots in tables 1, 2, and 3. These tables may also be used for compiling the survival data. In these diagrams the legends for the row designations in these tables are as follows:

For the original treatments, 1938-39.

First letter indicates season:

F - fall

S - spring

Second letter indicates method:

N - planting with nursery stock

C - seeding with cotton netting

H - seeding with hardware cloth screens

Third letter indicates degree of spot preparation:

L - large scalp 30x30 inches

S - small scalp 12x12 inches

N - no scalping

In the 1939-40 plantings and seedings, fall seeding with cotton netting was replaced with additional replications of fall planting; spring seeding under screens was replaced with additional replications of fall seeding under screens; and spring seeding under cotton netting was replaced with spring planting. Because of these changes in treatments, the following translations in legends are necessary:

Row Designation	1938-39 Treatments	1939-40 Treatment
FC-	FC-	FN-
SH-	SH-	FH-
SC-	SC-	SN-

The situation was further confused, however, by switching the the positions of the SC and the SN stakes in the 1939-40 installations. The SC legend still indicates spring planting (SN) in 1940, but if the treatment of one of the original trees is to be determined, the legends will have to be transposed to their former meaning. Hence a tree planted in the spring of 1939 (the SN series of 1938-39) is now designated SC and a seed spot sown in the spring of 1939 (the SC series of 1938-39) is now designated SN.

Two classes of planting stock were used in the 1939-40 plantings. The FN and SN rows are planted with 3-0 ponderosa pine from the Bannock Creek Nursery, and the rows marked FC and SC (meaning FN and SN in the 1939-40 plantings) are planted with 2-0 ponderosa pine from the Idaho Prison Nursery. Only the best two-thirds of the bed run of each lot of planting stock was used. The stock was sorted into three size grades and the poorest third was discarded. No attempt was made to segregate grades 1 and 2 in the planting job.

The Bannock Creek stock was from the mulch test beds, sown in the fall of 1936 and root-pruned to 12 inches in the fall of 1938.

The fall planting and seeding was done in November 1939. The spring planting was done during the last week in April 1940.

The fertilizer treatments superimposed on the 1939-40 installations are designated as follows:

N - no fertilizer.

F - A 1-1-1 commercial fertilizer consisting of equal parts of superphosphate, ammonium sulfate, and potassium chloride.

M - A mixture of 60 percent barnyard manure and 40 percent of the 1-1-1 commerical fertilizer.

The three fertilizer treatments were used in each of the 36 rows with five consecutive spots for each treatment. The sixth and eleventh spots in each row are marked with stakes bearing the treatment designation for the five spots following each stake in the direction indicated by the arrow on the stake. The fertilizer treatments on the first five spots of each row can be determined by the process of elimination. The starting point for each row is the end marked with the stenciled stake.

The 1-1-1 fertilizer was applied at the rate of one-third of a soil can per spot and was thoroughly mixed with about 1 quart of soil in the seed spots and perhaps 2 quarts in the planting holes. The fortified manure was applied at the rate of 1 full soil can per spot and mixed with soil somewhat less thoroughly than the straight fertilizer. Fertilizer requirements for the three plots were 27 gallons of fortified manure and 13½ gallons of straight fertilizer as measured in a three gallon bucket.

First year survival of the 1939-40 seedings and plantings is summarized in Henry L. Ketchie's Progress Report dated January 20, 1941.

Third Installation - Fall - 1940, Spring - 1941.

It was planned to completely re-seed and replant these plots in the fall of 1940 and spring of 1941, following the same schedule and procedure as in the fall of 1939 and spring of 1940, with the exception of fertilizer treatment.

As it is now believed that the almost complete failure of planting and seeding on fertilized and manured spots was due to over-concentration of the fertilizer in a limited space in the soil, no new fertilizer is being used in the replantings, but an effort was made to plant or seed

in exactly the same spot and to mix the fertilizer or fortified manure, as the case may be, through a larger body of soil. It is estimated that the volume of soil mixed was twice that in the original treatment. This procedure, together with the leaching and diffusion of the fertilizer chemicals over a period of a year or more, should reduce the concentration greatly and yet may leave sufficient available to the roots of the seedlings to indicate whether fertilizers may have any favorable effect under these conditions. It seems that at least the phosphate components of the fertilizer should remain in the immediate soil over this period or longer.

Fall Planting and Seeding 1940

The onset of freezing and snowy weather prevented the completion of fall planting and seeding as planned. Only the Station Area (Little Baldy) plot was fully completed per schedule, on November 6 and 8. On the Granite Creek plot only 6 rows of seeding were done (October 29), including the rows designated FHL, SHN, SHS, FHN, SHL, FHN; the 6 rows of Bannock stock were planted, but only about two rows (designated FC-) at the easterly end of the plot were planted with Idaho Prison stock. No work was done on the Elk Creek plot.

In the few cases where seedlings still remained in the fertilized spots, the new plantings were made alongside, hence without fertilizer in any quantity. These are so very few that no complications should be introduced in compiling and interpreting results.

The Bannock planting stock was from the same root-pruned beds (of mulch series, nearest pipe line) as in 1939, but is now 4-0 (or 2P2-0) stock instead of 3-0 age. The Prison stock was from the Idaho Prison nursery, as last year, but was 2-1 stock and hence a little larger and

sturdier than the 2-0 previously planted. The Prison stock was provided by Jack Miller of the Boise National Forest from a supply that he was using for planting on the Elk Creek burn at the same time. Enough was obtained for both spring and fall plantings on all three plots; the remainder was heeled in near the draw bottom of Spring Gulch, above the culvert of the road to the Flat enclosure at BBBES. If the Bannock stock does not look well after heeling in, fresh stock should be obtained from the nursery. It is doubtful whether additional stock from the Prison nursery will be available in the spring; so it may be necessary to use the heeled-in stock even if not in first-class condition. As before, each lot of stock was graded before use to cull out the poorest 1/3 of the seedlings. The heeled-in Prison stock, however, has not yet been graded. Roots of Bannock stock were pruned to about 12 inches.

Scalped spots were weeded and "freshened" by re-cultivation in most cases. This treatment may favor the remnant seedlings of older plantings in an abnormal way since continued weeding or cultivation was not contemplated, but they are so few that their future behavior is of less importance than the new seedings and plantings. It will probably be worth while maintaining records on them for a few years, however, to indicate the general development of such plantings, but not much more can be concluded in relation to the original variables in the experiment. Where feasible, in spots where old seedlings remained, the new seedings or plantings were made to the right (looking uphill at the rows) of the former.

Plans for Spring Installation 1941

Since the planting and seeding on plot 79, the Littly Baldy area was completed as scheduled in the fall of 1940, no changes in the plans for the spring 1941 plantings are necessary. The 12 remaining rows, the SC and the SN series will be planted respectively with the Idaho Prison and the Bannock Creek stock.

Since no work at all was done on plot 77, on Elk Creek, in the fall of 1940, the whole plot may be used as a test of 2 sources of stock, 3 fertilizer treatments, and 3 degrees of spot preparation using spring planting throughout the whole plot. The two sources of stock should be distributed as follows:

Not done

Bannock Creek in the FN, SN, and FH rows

Idaho Prison in the FC, SC, and SH rows.

The situation on plot 78 on Granite Creek is more complicated with the proposed work for fall 1940 only partially completed with 14 rows seeded or planted. The completed rows and a proposed distribution for the spring planting is shown in table 4.

Table 4.- Status of completed and proposed planting and seeding on plot 78, Granite Creek.

Rows completed Fall 1940			Rows to be planted Spring 1940	
Seeding	Bannock Stock 2P2-0	Ida. Prison Stock 2-1	Bannock Stock 2P2-0	Idaho Prison Stock 2-1
SHN	FNN	FC-	SN series (6 rows)	FC series (4 rows)
SHS	FNN	FC-	SHN	SC " (6 ")
SHL	FHS		SHS	FHL
FHN	FHS		SHL	
FHS	FHL		FHN	
FHL	FHL		FHS	

The unbalanced set up in plot 78 will probably result in heterogeneous magnitudes of variance in the survival data for the various treatments. If so, a complete analysis of variance using all of the treatments at once should not be made.

With eleven rows each of Bannock Creek stock and Idaho Prison stock involving 3 degrees of spot preparation and 3 fertilizer treatments, it may be possible to make an analysis on only these sources of variation. Perhaps a separate analysis can be made on the fall installations using 2 methods, seeding and planting, 3 degrees of spot preparation, and 3 fertilizer treatments.

To avoid confusion in arriving at the treatment for any given row during subsequent examinations, it is proposed to set out new stakes bearing appropriate designations for the 1940-41 installations. The stake requirements are shown in table 5. In addition it is proposed to mark any trees or spots surviving from either the 1938-39 job or the 1939-40 job with wire pins to distinguish them from each other and from the 1940-41 trees.

The legend for these new stakes is as follows:

First letter indicates season

F - fall

S - spring

Second letter indicates method and source of stock or seed.

N - planting with Bannock Creek stock

P - planting with Idaho Prison stock

H - seeding

Table 5.- Stakes needed for 1940-41 installations.

Designation	Number of stakes or rows			
	Plot 78 Little Baldy	Plot 78 Granite Creek	Plot 77 Elk Creek	Total
FNL3	2	2		4
FNS3	2	2		4
FNN3	2	2		4
FPL3	2	1		3
FPN3	2	1		3
FPS3	2	1		3
FHL3	4	2		6
FHS3	4	2		6
FHN3	4	2		6
SNL3	2	4	6	12
SNS3	2	4	6	12
SNN3	2	4	6	12
SPL3	2	4	6	12
SPN3	2	4	6	12
SPS3	2	4	6	12
Total for all plots	36			111

Third letter indicates size of scalp.

L - large scalp (30x30 inches)

S - small scalp (12x12 inches)

N - no scalp

The number 3 indicates 3rd installation (1940-41).

Fertilizer treatments are already satisfactorily designated and should not be changed.

Summary of jobs to be done in 1941 in order of priorities:

1. Make and set out stakes for the 1940-41 installations. ✓ (= done)
2. Make spring planting. ✓
3. Assemble and set out wire pins for marking trees from previous plantings and seedings. ✓
4. Make missing survival counts on the previous plantings and seedings. ?
5. Make plot diagrams showing treatments and survival numbers for all three installations. ✓
6. Make analyses of variance on older data where shown to be desirable from the tabulations in (5).
7. Make germination counts on fall seeding of 1940 in June 1-15, 1941. Also get survival counts and condition of growing trees on planted rows. ✓
8. Make survival counts in October 1941 on all rows in each plot. ✓
9. Compile and analyze data and write up progress report. ✓

(No work done on Elk Cr. Plot in 1941)